

Trip to Wyoming

1899

~~First~~
second bord.

doc. 80

Property of Charles
Schuchert

U. S. National Museum
Washington, D. C.

Forest Field Expedition consists of
July 21st
19 wagons
24 tents
6 Cooks
85¹ Directors, Prof. Knight
geologists, students ~~and~~ ^{and} teamsters
of which there are ~~about~~ 19.

doc. 80

Como.

Anticline.

Red beds Triassic

Baktonodae beds marine Jurassic

Atlantosaurus beds fresh w. "

Great Dinosaur horizon. Look for
small mammals in "dirt beds."

Dakota sandstone. Plants fr. water.

Fossils 20m. east of Como station in cream
colored beds. Poor Lam.

Green River

Fossil beds 4m. W in R.R. cut. Also along
Pitts Creek.

Hampfork by John H. Hadolentham.

Marine Jur. loc. of Knight.
Freezeout Hills, Carbon Co. Wyo.

Collect ceph. fr Stanton from the
Benton of the Colorado.

Green River Station } Green River
Hamsfork " } loc.
from this place drive to Fossil.

Lebont's creek, Old Hayden loc.
Look for plants.

General section.

Archaean.

Paleozoic. Camb. & Carb.

Red beds Triassic

Marine Jurassic see Freycourt Hills

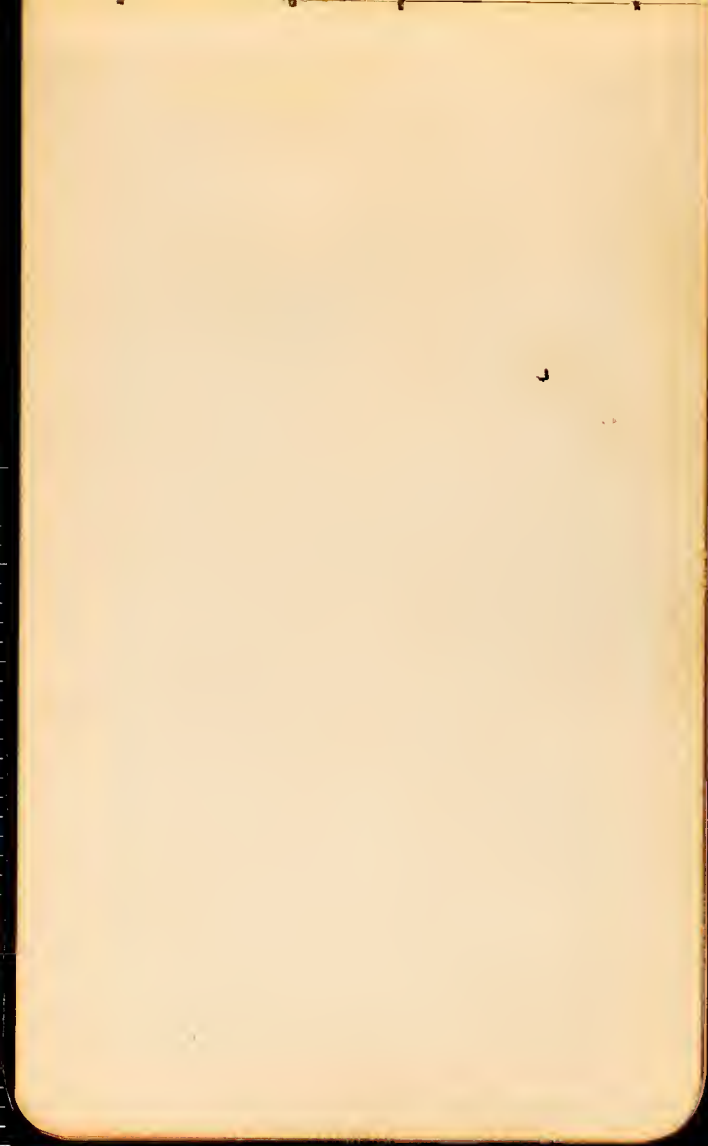
Fresh water Jurassic

Dakota fr. m. Plants. Geol.

Upper
Cret. {
Colorado { Miobrara, marine.
Benton, marine
see for cephalopoda
Montana { Fort Pierre, marine
Fox Hills marine 7000
Laramie { 7000 { Upper Laramie } fresh w.
Denver } } Ceratops beds.

Eocene Green River

" Bridger not in Vert.





July 16 - 1899 Sunday
Left Washington 7.20 P. M.

July 17 Monday
Arrived in Pittsburgh 7 A. M.
Chicago 8.45 P. M.
Left " 10.30 P. M.

July 18 - Tuesday
on Chicago North Western P. R. to
Omaha. Arrived there at 7.00
P. M. Left 11.35 for Saranac

July 19 - Wednesday.
Arrived at Saranac at 10.30
Spent most of the day at the University and
later drove around a little with Beechey
Callahan & Moore. In the afternoon there
was a meeting of the organization. ~~Prof.~~
~~Prof. Abbott~~ was elected temporary
chairman and Prof. Barbour temp

an secretary. A committee was ^{announced} elected
by them to prepare officers in the expedition
this com. consisted of Hambach, Knight
Barbour, Knight and Schuchert. They
appointed the following officers, who ~~elect~~
~~the~~ were elected by the assembly
on 1st of December.

Director and President

Mr. Wilbur C. Knight.

Secretaries

Collins Cobb

Van Norman

E. H. Barbour

Referee on Part Pol.

not present H. F. Osborne

Merriman

Ref for Insect

H. Hambach

C. Schuchert

Ref for Botany

Ref. for Petrography
A. D. Lawson
A. R. Crook

Ref. for General Geology
Fred. B. Peck
Broadhead.

Ref. for Physiography
George L. Collier

Ref. for Art and
Cameron
Photographers

R. Q. Meisenbach
H. G. Cornell

In the evening there was a recep-
tion. The Pres. of the University spoke
and a number of others. I attended
the talk in the evening. Nearly
all the prominent geologists spoke.

July 20 - Sunday
Purchased a few things in the
morning and made up for the
trip.

Paid \$10.00 for the cabri-
ole and understanding that he will
rebat if I do not take the entire
trip. Later in the day learned
that the start will be made
tomorrow morning.

July 21 - Monday. Camp I
After a great deal of talking the
exped. started at 10 o'clock. It is
very hot here. Keep himself with a great
deal of food management and
order. Left three paid passengers
start.

In a general way we go north-

and go on the day tomorrow.

ward over the ~~Big~~ Laramie plains
and the Big and Little Laramie rivers
to a place called St. James or 7 miles
back. But, I left him behind and
no one knows the stopping place and
finally we go into camp without him.
After another scramble and a wait
for something to eat he turns up.

He came about 18 to 20 miles over
a rolling and generally rising country. The
country is a desolate one, no farms and
probably a house every 5 miles. The plain
is a, sparsely grassy one, with cactus
and, here and there, yellow holes. At one
place 7 miles from Laramie there was
a run of quite a ^{and a *Stacatum* lake} wet country.
The heat during the day was great and
heat wave, very extensive accompanied
with considerable mirage effects.

At the lake look one of the party collected
Fort Pierre fossils and I collected some
Inoceramus from the top of the hills said

to the Fox Hills.

July 22 Saturday. Camp II.

Got up at 5 and had breakfast at 6.
started away ^{from} "Alkali Camp" at 8. Drove
3 miles off the way and arrived at
Copper Creek Camp at noon. Distance covered
~~about 11 miles from Alkali Camp.~~

All the hills in this region are
Fox Hills formation which have been flamed
down and covered with a layer of
granite and many boulders of considerable
size. In the Fox Hills wear down this
boulder from cover all the slopes. At
first I thought the boulders had been
deposited with the Fox Hills sandstone
but further observation and consideration
did not uphold this.

Today and also yesterday we saw
lakes (I guess) which appear like sinks

Prof Knight says that the Niobrara below
is largely calcareous which explains the sink
idea. The Fox Hills is porous and the
water gets down through it carrying away
parts of the Fox Hills and therefore a sinking
of the ground. Of course all taken on the
Karamia Plains are not sands but most
of them appear to be

In the afternoon about 30 of us
collected Fox Hills fossils. I gathered a few
of the rarer forms. *Proceramus* are very
abundant. All the fossils occur in nodular
masses which when unweathered are very hard
and blue in color. Otherwise their color is
brown and leather covered. Secured a
bryozoan and a coral among other things. Of
the latter Mrs. Limnigan has fine good
example.

July 23 Sunday Camp #2

Camp of yesterday remains unbroken today. After breakfast drove over to the foot hills of the Medicine Bow Range and climbed to the top of one which ^{was a Copper mine} ~~was a gold mine~~ ^{one which} is probably 2000 feet above the plains. Here we found snow (about 10,000 ft above the sea) and had a grand view of the Laramie plains with H. Warner and Copper Creek lakes in plain view. Other lakes, ~~and~~ smaller ones, could also be seen and in the far distance Laramie Peak stood up. Distance about 50 miles.

Laramie Plains is by no means a plain surface considerably cut up by gullies, holes, and rivers. It is a treeless tract but towards the mountains Copper Creek and Rock Creek bottoms are very green with small meadows and other trees. The mountains are thickly wooded.

with conifer; quaking aspen etc. Flowers
and beautiful ones abound everywhere in
the vicinity of springs, creeks and rivers.

The mountains are made of crystalline
and eruptive rocks supposed to be of Algon-
Kian age.

I had a long talk with Prof. Knight
and one of the remarkable things mentioned
in the report is the case of the Cretaceous strata.
The Laramie is said to be 7000 feet
and a similar thickness on the
Fox Hills and Fort Pierre. The present
mountains are Post Cretaceous since they
break through the Cretaceous deposits!
This is the opinion of Prof. Knight.

A more notable structure is the elevation of
the Medicine Bow & Laramie Mts in highland
area with rapid erosion and deposition in the
ravine now between the mountains. With the
introduction of the Laramie there was another
physical change beginning with a great conglomerate
with boulders as large as a man. This was

also the introduction of great water. The conglomerate is of the same age as the Medicine Bow since one sees in it identical rocks. This is also the opinion of Prof. Lawson. This opinion is given with confirmation in the fact that a thin line one finds Carboniferous - a Permian rock.

July 24 - Sunday, Camp III.

Left camp 7:15 A.M. and started for Lutton Creek Coal Mines where we arrived at 11 A.M. ^{Distance about 10 miles} The lignite is exposed in a small run in the stream. The creek flows along the bed of the coal.

Dip North.

18 to 20°

3' Shale

2 1/2' ^{Sandstone sandy out in yellow brown at base} Shale with sandstone leaf horizon

6' Shale

4'

2'



Lignite
Forest Lignite

The lower part of the section is a...

The leaves have been drifted to this place since all are in fragments. The more perfect leaves are in the surface sandstone.

The leaves in the main horizon are on a buff thin layered shale and are completely matted one above another. ~~and that with their~~ imperfect condition and their abundance nothing of much value in the way of perfection can be secured.

The lignite bed in the lower four feet is a shining black light material becoming more impure above. The following shale horizon is composed of a number of bands of bright yellow with brownish streaks passing above into the buff leaf horizon. This is followed by a seam of whitish more or less coarse sandstone, sometimes with small pebbles from 2 ft to 6 feet thick. This follows another brownish bituminous layer about 3 feet thick with the surface capped by more or less coarse sandstone yellowish in color and often streaked by iron stains.

At 2 P.M. left Cotton creek and
pitched camp on Rock Creek about
one mile from the new K.P. P.P. cutoff.
Distance about 6 miles.
On our way to this camp for the last
four miles we came down the valley of
Rock creek. The valley is several miles
wide and in one place hard layers of
sandstone are seen on both sides of the
valley dipping in opposite directions! Rock
Creek therefore has cut its valley down
through the apex of the anticline with the
sides dipping S.W. more S. Dip appears
20 to 25°.

After arriving in camp walked S.E.
up over the valley ridge from camp and
came across three outcrops of sandstone.
The first one is about 3/4 mile away and
stands out in long mounds of iron-stained
sandstone. In this I noticed nests of a
very large *Incisuramus* and one of the

Prof. Peck's man
men found a red sandstone. The next sandstone S.E.
is not fossiliferous followed by a third
which bears numerous small fossils along
with acutites and belemnites. About $\frac{1}{3}$ mile
more S.E. there is a very prominent outcrop
which I will examine tomorrow.

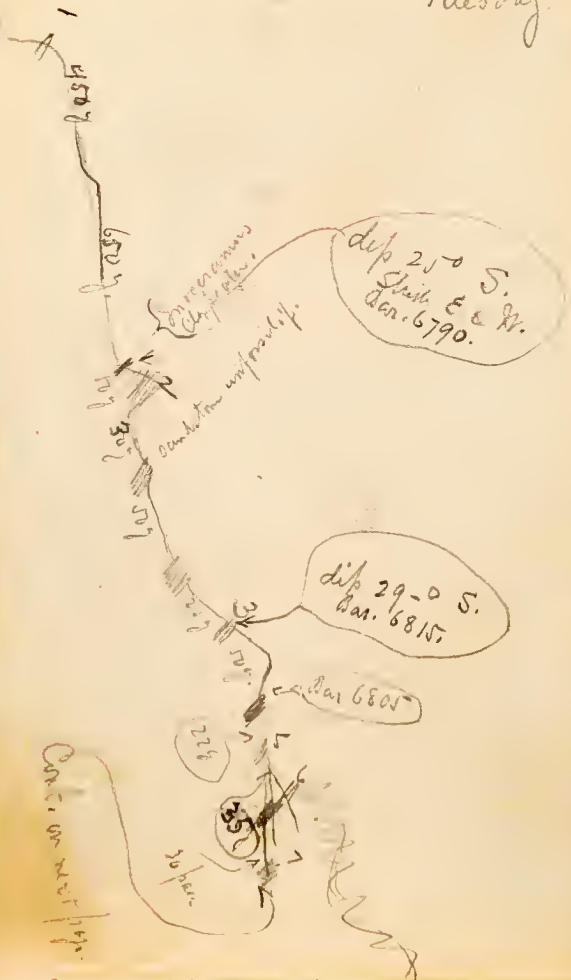
Peck Creek shows clearly how a long
plane is produced. On each side of the
creek there is low bluff the one on the
northern side most precipitous with the
creek meandering through its alluvial
bottom. On the higher terraces no alluvium
can be detected. At different times the
stream has cut down its bed ~~down~~ to
a stationary level when a change of level
took place another terrace ^{was} cut.

The quartz pebbles here again show the
evident effect by the heavy sand and in
places the sandstone is pitted due to
solvent action.

2000

Reddish floor plain

July 25 - 1899
Camp III.
Tuesday.



1 Thin rubies, and localities

2 Sandstone sandstone small scale. Containing localities, very large boulders, Datura, Cardium and other fossils. Also Cyprina

3 A thin layer of mica, mostly the fine, calcareous layer.

4 Gneiss layer. 3 yards ~~30~~ 30 yards wide.

5 Gneiss layer. 29 yards wide.

6 Sandstone layer 45 yards thick. (Quartz layer, above the layer of the quartzite are covered with large boulders.)

7 Gneiss, ~~dark~~ dark, containing occasional limestone nodules. With some fossils.

8 Gneiss, ~~dark~~ dark, containing occasional limestone nodules. With some fossils.

9 White soft sandstone. With palm leaves, conifer fossils. Also by hand. The fossils are sandy shales. Some thin layers of mica.

From forward pass.



def. 20° S.
Shale E. & N.
Cor. 692.



shape
Ridge with
Pine
"Pine Tree Ridge"

310 yd.

Cor 692-
Dip 20° S.

July 25 - Tuesday. Camp. III.

Resumed work this morning on the same beds of late yesterday.

In the face of the creek bluff (locality 1) I noticed *Laevulites*.

Locality 2 is at the base of the most prominent sandstone ridge and contains oysters, large *Mytilus*, *Cyprina*? more *Loxostoma* etc., *La. of Peck*. Many species do not appear to be present. I have three specimens.

Locality 3 contains a number of small specimens. I have specimens.

Loc. 4 we named the *Laevulites* layer although *La. of Peck* have numerous gastropods. I have specimens. I have included a number of layers in a

Loc. 5. *Ammonites* layer. This horizon is very rich in fossils and has not only *Ammonites*, *Beliceras*, *Baculites* but also *Laevulites*, *Strophomena* and another genus of *Ammonites*. Fine large gastropods occur here. Prof. Barbour had the luck to find the first nodules and secured a large collection. *Ammonites* occur & occur in the widely separated ones but this is the

in contact with them. I have included a number
of layers since they closely adjoin.

Loc. 6. In a series of eight
limestone layers not nodular. Here Cardium
is the prominent fossils. In this zone a few
small teeth were found. Two Prof. Lawson
and one by Prof. Charlton. It may be near the
zone that the latter described as a sub-belt.
Plesiosaurs? we also the rest I have for
another gathering.

Loc. 7. Laces above Loc. 6 is a thin
zone, probably for the first time a good
abundance of *Tricranurus* and scattering
bones. Above of the latter a few but Prof.
Knight collected others for Mr. Hamilton.
This is the most important find of the day
and was made by Prof. Brown of Morgan-
town, W. Va.

Loc. 8 is quite a distance south of the
plant horizon and has numerous fragments of

Collected at Peter Mamm. Several large
lumps of the ammonite. One in party can
see the green leaves. I collected and the
other I did not. Some not listed by me. The lot
are for the G.

The leaves on the Inoceramus layers wrapped
up separately belong to Prof Knight. Knowledge is
of collecting them and return some to Prof
Knight. (Later he asks only for a report)

July 25 Wednesday, Camp III.

Started out with the wagon to collect
between Camp III and the W.P. & D. and
then along the track toward Camp I. When
our wagons got lost on a very rough
gravelly trail and when we finally took
them it was too late to go on. The
Inoceramus shells are not better.

The only thing I saw was a very

small, thin and very large

West of Pine Ridge

prominent nodular ridge with very large
concretions, some of 18 inches in diameter.

We were caught in four heavy rain
showers. For an hour and again the rain
was particularly heavy and the rain bow
effects very brilliant in fact more so than
I have ever seen.

One of the party collected a bone in
the bog holes near Harper on the N.
R.R. which he says is of a *Leiomys*
The bone is vertebrae not concave, very
porous with all the processes united.

July 27 Thursday Camp III.

Very little is done this morning and
a good deal is being made up.

Yours are in busy packing, my material
is in the railroad. I have two
sacks which I have addressed to Denver
of course, these have been packed.

I broke camp by nine and got
started at ten. At noon we take lunch
at Thornton's ranch in the bottom of Rock
Creek. There is a fine example of stream
meander not less than 8 loops in a
half mile of meadow bottom. It rains
again quite heavily by one and near
one we have hard snow and rain.

On approaching the highland before
we enter the Larimer country we see
flock after flock of antelope. They
are in herds of from 8 to 12. Thirty-one

over counted by Van Norman and other say
50. He also saw two isolated Elk. A
Jack Rabbit and occasionally a coyote
come into view.

At six we camp just S. of the N. P. R. R.
station near a small lake. Come to the N. of the
R. R. and the Come Junction bluff to the
S. Distance from last camp about 17 miles by road.
Make the cooks prepare supper for 5.
To. Come bluff and soon find Ammonites
and Belemnites.

Other members busy in Dinosaurs pay-
ments and the vertebra of *Saptenodon*.

Larson found the body chamber of the
Ammonite from the Frege but this sent to
Stanton by Knight.

Collected at Detroit found *Astarte* like shells
associated with Ammonites. These are in the
Babtanodon beds

July 28 Friday. Camp IV.

After breakfast spent the morning on
Lower Bluff. Found fragments of *Alinagan*
bones in the Red beds and in the green shale
immediately above it nothing of value.

Collected some marine Jurassic fossils
which are quite rare and returned to camp.

In the afternoon drove westward to the
end of Lower Bluff where the iron strata can be
seen in a fine anticline. Here the arch is shown
in low Tertiary rocks. While on each side the strata
dip southward at about 25° but nothing at about 60° facing
northward in the high part of the base of which is
the U.P.D. At this station and a close above
the formation of the arch and the curvature on
the same is evident. Farther to the west is the valley
of the river and its numerous meanders. The
Sketches on the next page show the anticline at
this station and the intended to Philadelphia
this route and the valley runs parallel.

From here at the station can see the

day of Mark Styraun a strata of nearly
60.

When I returned to camp found that my
tent had been deluged and my bedding soaked.
Prof. Knight brought in his bed and we slept
together.

I saw numerous places for the same reason
and would like to believe that complete conformity
would be result in uniformity. I saw a
specimen at the eastern end and turned it over to Kropf
who will stay to dry it out. Carter also found
a specimen in the sea beds, the largest horizon.

Aug 28 on my way to Lake River I saw again the
Como Bluff. To the east of Aurora station
several miles one sees much of the Ft. Benton and the
Astartosaurus beds begin to appear in a very low
Bluff. On one occasion westward along the railroad
the strata rises higher and forms the "Como Bluff"
and lower are lower strata in the valleys
making their appearance. The track westward cuts
through the anticline and reveals the strata much
as shown in several diagrams. The area continues to
the west - G. D. of Medicine Lake.

July 28-09

Can. of
Shells
H. Benton?
See list at

} Salolite

————— Fault

==
E.

to diam. 100 ft

Salolite

approx 600

(Salolite)
and in some places

Can't believe
will live

int.  Dinosaur
Bench

Belmini's

...and to the
...red dust

10

1875

Dip

1867

Q. 10. 2 each - 1/2

Ed H.S.

come thru
4 miles
21

Dear Mr. [illegible]

Wm. A. L. /
S. W. L. /
dub. m. 1750

July 28-99

come left 350-410 air

was

time left 1/2 hr.

Colombia 1/2 hr.

For 1/2 hr.

1/2 hr.

)

Oil road E. P.

Eastern side
July 29-99

1 Corn bluff

Oil road 250 feet.

Red sandstone and sand shale 20 ft.
Capped by white sandstone

Red beds
Estimated strata 15 to 20 feet.

White heavy bedded ss. cross bedded with
about 20 feet

Red shale 5-7 feet

White sandstone shale 10 feet

Red shale 8 feet

The top of ss 2 ft

Red shale 4 ft.

Drift sand & gravel but
more clayey than the N. 7.

Drift ss & sand passing into the local thick coarse ss. 22 ft.
Slightly clayey limestone at top. End of series.

(White)

Greenish to buff sandy shale. Depth: from 10 ft. to
Hence for many valleys 20 ft.
Dolomite - Ammonite horizon.

Buff coarse heavy bedded ss. about 10 ft.
Dolomites.

Buff ^{2nd} ss. & sandy shale. As this down valley it becomes
more clayey with more
Dolomite.

White coarse ss. 5 ft.

Soft buff to greenish sandy shale about 10 ft. { Sand & Ball.
Main Dolomite horizon.

White to buff ss. 15 feet.

Greenish shale with bands of brownish limestone
crystalline fossiliferous. 20 ft.
The limestone was broken and is in many
pieces.

Greenish massive
sandstone.

See 112

(No. 100)

over

See
 section 1/2

Shale ss

ss

Shale ss
 Reddish bedded
 with mud grain
 often very cherty
 thin shales

ss

Buff shale sandy
 Red & ashstone

July 29-99

Section 60-75 feet

Shale ss

above red sandy
 buff shale with
 some red clay
 thin shales. Towards the top thin sand
 & sandstone appear intercalated by the
 shale.

Shale ss is more or less
 sandy. Buff ss into argill.
 thin - argill. ss. Buff ss.
 45-

July 30-99

July 29-99 Saturday. Camp IV.

Setup at 6 A.M. and after breakfast made the section of the eastern end of Corner Bluff.

Broke camp at noon and at 11.45 arrived at Medicine, Iowa on the A.P. R.R. After looking over the village and its beer saloons and gambling houses drove a mile to the Medicine River where we had lunch. At half past one started for our night's camp. Pay, Knight and I go back to the station to adjust tickets for the returning party and when then half an hour we had gone on the rocky trail. After looking around on our horse we saw Knight riding 3 or 4 miles away ^{riding} in an opposite direction. One of our horse men quit with him and then we proceeded ^{for} "Nine miles" on the route Medicine, nine miles from Medicine Iowa.

On our way ^{and west to} to the camp we saw one of Osborne's boys with his photo book.

My observations at Corner Bluff show that the strata here are somewhat of con-

ions through the ^{and not the} ~~rock~~ ^{rock} and is
about 106-113 feet ^{and not the} ~~rock~~ ^{rock} The marine fauna
170 ft; the fresh water fauna 130-150
feet and the Oolite sandstone 40. The
entire thickness of strata is not the
real rock track to the top of the Bluff
on which is 478 feet. Estimated. However in near
Farmington Broadhead's ^{and not the} ~~rock~~ ^{rock}
I see no reason for assuming that the
strata are fresh water since Smith
says he found in the ^{and not the} ~~rock~~ ^{rock} a
marine bryozoa. If this is true then the
strata of ^{and not the} ~~rock~~ ^{rock} have marine strata
of ^{and not the} ~~rock~~ ^{rock}. The absence of a marine
fauna in these rocks is the strongest argument for
the fresh water origin. But if the strata are
of marine origin.

After dinner Mel came down river
and looking over to Clam Bluff another anti-
dune came into view which is nearly but not
quite as high as the first one. I have taken

two photos which may help to show this structure.
This region is a splendid one for structural
geology and splendid models can be made of it
for school purpose. Talk to collector of these.

July 30-99 Sunday Camp V and VI

After breakfast walked over the Jurassic
Hills near Camp on the Little Medicine at Horse
Shoe Crossing. The coral beds they I secured
came from the top of the massive limestone just
underneath the ^{limestone} ~~limestone~~ ^{limestone} horizon. Belemnites came
in a little lower and below the main Belemnite
horizon I secured the teleosts.

The section here is the same succession
as at Camp only that the beds occur in low
hills which make the exposure more accessible.

We broke camp and left at 9.30 A.M.
Arrived at the north-western end of the Frege
Out Mt. beside a road spring by 2.30 P.M., 12
miles by road from "Horse Shoe Crossing".

After lunch started up the hill over

Feb 30. 1894.

20 June

40.

1855

100

1870

30 pms
 70
 75
 60
 50
 40
 30
 20
 10
 0

53

Handwritten notes:

- For the purpose of study
- See in the record.

[Faint handwritten notes, possibly bleed-through from the reverse side.]

(55)

Conf. limestone
Dip 20-75 feet over.

350
350

15 ft
15 ft

2 ft
2 ft

(110)

(115)

(90)

Circle of products in same
which occur in same
small.

There is probably a lot of
disposition of the
of some of the
55 ft down

75
6
30
30
40
100
25
278 ft
in the.

N.E. ? see sketch

See 9 pp. over

There is a lot of
disposition of the
of some of the
55 ft down

of course over the Dakota conglomerate. After
passing over the crest about down into a valley
which ~~is~~ has the glenside as you and
on the other side ^(Freeze got me) the Dakota conglomerate appears
the continuation of the beds ^{of the first piece} instead of ~~being~~ on Freeze
Quit Mt. passed down the valley, north and
west in the great valley westward. Here my
attention was attracted to large masses of sand-
stone. I then concluded to climb the
ridge ~~from~~ the valley and made the
section on the reverse side. I was greatly
surprised to see that here the ^{upper} glenside
was instead of ~~being~~ the ~~glenside~~ throughout has at
least a foot of heavy bedded sandstone.

Here at ~~the~~ the marine limestone
beds are ~~not~~ ^{not} ~~seen~~. The only fossils gathered
are ~~not~~ in the section on the horizon. The
thinness ~~is~~ ^{is} ~~the~~ ^{the} same as at
Crom Bluffs. The character of the bed and
bedding ~~is~~ ^{is} ~~the~~ ^{the} so called fresh water
deposits are different.

July 31-99. Monday. Camp. 81.

Started out on Tuesday. Did not with Hanson
and Corne. Revisited my station of yesterday.

on the low slope of the dome beneath
Troy, but not, which is a fact beneath
the wall the massive ^{in the Red Sea} masonry collected a number
of small fossils. This forms the rim of the Amphi-
theater. These are in the upper Tertiary

Lying on the slope and looking North to Tuzigoot but one can see the strata arching from the north, east and west. Along the ^{and northern} western ^{upper portion of the} sides of the arch the ^{the} ~~thin~~ shale of the Dinwoadie horizon in large part replaced by a thick bed sandstone which on the eastern slopes there is no sandstone in this zone. The distance across from east to west cannot be more than four miles and yet there is, the gradual change.

All that have seen agrees to me that
the Oceanic region is soft, fresh water
or m. It lies conformable upon the marine, ^{and}
conformable beneath the Dakota, which ^{is} ~~is~~
(continues 2 pages over)

The section and the one of color in table
 along a north and south line from Treey Cut Mt. south-
 ward.

Variegated beds green and red
 Shales mainly red.
 Run to Camp Point water.

7475 Bon.
 Sandy limestone with
 fossil corals.
 7 to 8 feet thick.
 Grey beds ss. & sh.

* 7100 Bon.

Truly rounded, Red beds seen in place
 46 N.E. 16° dip. The n. side is in the water
 { Red bluff.

Yellow green of 8 feet.

Thinly bedded
 light grey ss.
 White Green ss.

7075 Ans. 5' Green
 5' Sandstone
 2' Green

46° N. 81°
 7000 Bon.

Red only Red only Red only

* Below the Triassic rim capped by limestone there is a very wide and long valley probably not less than two miles to the gulch at the base of the high hill or mountain. The thickness of the Triassic beds in the valley amphitheater may be considerable since as one passes southward one rises and drops over many more escarpments. Triassic ^{sandy} shales and sandstones. The thickness may be not less than

— The dip of the strata in the valley then continues up over a very high hill or high of not higher than Frege Out Mt. I could find no place on this Mt. exposing lower strata than those in the gulch but undoubtedly in places lower and possibly Paleozoic rocks can be seen.

Larson found a good outcrop here along the western side exposing at least 1000 feet of a coarse sandstone with a thick limestone below. This series may represent Carboniferous.

(Continued on 2 page back)

page contains a marine vertebra. The nature of the sediments, ~~and~~ particularly the changing conditions and the whitest sandstone is evidence for littoral marine deposits. The dinosaurs are found sometimes as if mixed and again but fragments of bones, broken sections occur. Entire skeletons or nearly entire are rare. Some of the bones show gnawing. The only evidence in fact other seems to be the absence of marine life but fresh water life is also wanting. On the other ^{hand} if we hold these beds to be lake beds we must admit a lake encroaching on the sea followed by another littoral sea deposit. The latter is more admissible but the former is in doubt.

Returned to Camp by five o'clock today about 14 miles.

I understand the following order as being the order of the system for dinosaurs. Osborne says "New Mexico Crossing".

Knights, Hillister and Fred Chamber in the
Freeze Out Halls and the Carnegie people
in this vicinity. Five parties.

August 1-99 Tuesday. Camp, VI.

After breakfast started with the men
in the Freeze Out Halls to Knight's Dig-
gings. Collected all the morning in the
Marine Jurassic.

In the late afternoon collected near the
top of the Atlantosaurus beds at a locality
discovered by Knight and Barton. ^(Just back of Dr. W. S. Sack.) In
these strata (6 inches) yielded, fresh water
shells, 2 species of *Ammonoites*, 1 *Planorbis*, 1
Physa, ^{*Cicadella* tooth} and possibly a fragment of *Crinoid*.
This is an important discovery since the
beds are all the appearance of marine
marginal deposits. Collected a number
of specimens. Mr. Barton will work
out the fauna.

A number of the party looked for

Ammonites. - one and Mr. Jones
secured one, red one and 3 smaller ones.
I believe this is all that we secured.

A number found fragmentary *Ammonites*
bones.

Prof. Smith has 3 claims in this
region one of which shows bones 1000 ft. in
length. His main mine is about 2500
feet deep. He was not able to get
more than 250. I don't believe there
will be difficulty to locate bone localities
but probably the best arrangement will be
to go over with Mr. Smith. The
expense will not exceed 50-1000 dollars
per year. The bones when taken out of the
ground are practically cleaned but require
putting together. The expense to secure
a good *Ammonite* collection need not
be excessive.

Saw Martin today of Williston's party.

He tells me he found 4 Cretaceous birds this morn. Williston is to have first pick and then Martin is to write us. Ben Grinnell shot in in Burlington.

There is every appearance that all the beds of the Tertiary Out Hills are of very shallow water since many of the beds are ripple marked. Such have been seen many in the R.C. beds where the limestone is also ripple. Same have been seen in the Wisconsin horizon.

The transition from the marine form to fresh water form is a gradual one and is not dissimilar from those before. I cannot believe there was a lake but rather an arm of the sea which soon filled up and became a fresh water moraine due to stream beds flowing from a high land. With the introduction of the Dakota there was a physical change and introduction of marine conditions which prevailed through to the top of a marine terrace when it was closed off of this region.

August 1. In my section of an
 Tazewell Mt. measured with a level
 & T.C. scripkins. Dip about 15°

Wallops ss. about 7 feet

Core not seen so that the green shale may
 be a little thicker than in given.

Green shales with 2 layers of limestone
 each about one foot thick. 85 feet.

Thin bedded sandstone 200 15 "

Massive white ss. 160 "

Sandy grey to buff shales 20 "

Bl & grey shales & ss. with nodules 30 "

Grey shales, Belemnites. 40 "

Massive grey ss. 110 "

Grey thin bedded ss. 30 "

Bl & grey variegated beds shale

and ss. 70 "

Transverse limestone with fossils. 8 "

Amphitheater.

In the section of a previous page

fresh water
 Division ss.

Marine ss.

Aug 2-94 Wednesday Camp VI & VII
Broke camp and left Frege But Mt by

9.30.

Shipped to Lawrence 2 sacks of fossils.

Hambrecht, Todd, Carlson and Culbertson
left for home.

During the afternoon we found another
uplift of Permian-Triassic in which the Triassic rocks
formed cliffs from 100 to 200 feet high. The
structure here is about as at Frege But Mt.

Took a picture of the hills. We are 40 Mi. from
Mud Lake now.

By 5.30 we camp at Sullivan's Ranch
in Shirley town near high hills of granite
and paleozoic rock.

As soon as camp is pitched I started out
on the hills and found them rather away from
what I expected. The structure is now clear
in places. A rapid run of 1/2 hour
revealed a number of strata which struck to
be Cambrian and then Paleozoic strata. At
a fault cutting off the Permian-Triassic

It rained a little during our preparation in camp and also during the m. h.

Aug 3-99 Tuesday, Camp VII & VIII

It rains again this morning and we cannot get away before afternoon. It rains most of the morning so I set out to see the geology. After the rain in the rain it is plain that the succession here is the same as that of the Frege Out Hills only that the strata here more abruptly upturned and the section somewhat lower.

Collected a number of fossils from the Triassic limestone which may be called the Frege Out limestone.

At dinner one of the young men shows me Carbon fossils which mark the presence of Triassic limestone. We find *Productus* *centronatus* large var., *Productus* small conch and

Madison limestone. The middle of the Shively
contains large round Productus smooth and well

Lemnicula.

Our camp is pitched near the base of Shively
Mts at Lullivans Ranch. Just back of camp
about $1\frac{1}{2}$ miles in Saw-tooth gulch takes its
name from the Mountain. Along a sandstone
ridge which gives it a saw tooth edge or
serrated. Shively basin includes are the
low land between the Jura Trias Mts on the
one side and Tertiary on the other. Above the
Tertiary plane one sees a flat topped Mt.
locally known as Chalk Mt.

Mr. Lullivans says Tree Cut Mt takes
its name from the time when Fremont crossed
through here. He camped during the winter
in this Mts and there lost some of his men
by freezing. Therefore the Tree Cut Mts.

We leave Lullivans by 2 P.M. and arrive
at the head of the Shively plain by 7 P.M.

This afternoon we travel along the Shively
Mts passing the foot of the Tibbets ~~and~~
the Madison limestone and then the granite.
After seeing out of Shively basin we come on

to the north of Stam. There a great number
of nests about 1000. In the 1000 miles
there is some here down the blue
nest and camp near Maitze ranch.

Aug 2-00 - Tue. Camp II

" The Shrike-monarch of the 100
54 birds of all nests. When he drank he drank up the fruit
and go on one hour, he ate
about 1000 of the fruit
and he came back again
to the fruit in the morning.

From here on the by the river.
Crossed by Vincent, Coe, Cedar Rapids, Wis.
and down by the Forest Lake. She did
to the house of the river.

To the land of the Red Indians.

This morning by 8.30 after a heavy dew and fog we leave for my old Creek old about five miles. All of this length the sage hens are very abundant and every body is out with the gun. Results about 100 chickens. They are very tame and often lose or throw shots will be over before it flies.

We then cross the river land and by noon through granite Mts; the Indian before into where we have lunch. Here another heavy rain overtakes us and by 2 P.M. we start on the Snake Canon where we arrive by 5.30.

After having our noon day lunch place we pass around the granite hills and up a ridge onto the richest Tertiary strata. Here I have a good view of the granite hills and in the distance ^{to the right is} ~~the~~ Ferris Mts. Passing up the river and we eventually descend and soon after we see the lower series of Redoubt. They were and are very uniform the weathered clay beds. It is upon a picturesque and mountainous.

Platte River
about 2 miles from

Carboniferous

Alps

Ordovician

Carboniferous

300 ft
Shale limestone

250 ft

Brick

Site

100 ft. can

Carboniferous

Ord.



May 2nd IX
 From a high line of Tertiary.

Stare from photo of this. See if
 they are kept out.

Continuation

Tris line
 marked as outcrop.

Stare
 Stare

Stare
 Stare

Stare
 Stare

Stare
 Stare

Stare
 Stare

N.B.

Stare
 Stare

Stare
 Stare

Stare
 Stare

Aug 5-9. Saturday. Camp IX.

Prof. Knight led the party from this camp
in the morning about 2 1/2 miles distant
the left wing over the Tertiary and soon ^{outside of} reached
the whole sandstone of the Lower Triassic of which
I took a picture to show cross bedding. Passing
over 2 or 3 small hills we follow a dry creek
which rapidly terminates into a canon and pass to
our view a splendid view of the narrow canon
of the Platte about 1000 feet deep. Our position is
above the Cambrian on ledges of Ordovician rocks
see sketch.

The granite in the bottom of the Canon is a continuous mass and apparently a red granite. The
The granite forms a columnar structure
above is a series of thin beds of red, brick
red, Cambrian shales. Over this are apparent
conformable is a thick series of yellowish and red
in two are dolomites with seams of chert. Towards
the top is also beds of light bluish limestone
appears in which Mr. my collector has found no
fossils. Towards the base in the yellowish dol-
omite the fossils are abundant.

the top of the bed of light colored limestone
offices in which the fossils are preserved has been
made Mr. Grant's second species of *Trilobites*.

Over the Ordovician and possibly unconformably
lies the Carboniferous limestone of Medusa age.
This is all that can be seen in the Canon at the
point of observation.

In the way back to camp I ascended one of
the high Tertiary hills and looked back towards
the Canon. This view shows a regular succession
beginning on the left with the granites and passing
to the right through Cambrian, Ordovician, Carboniferous,
Triassic, Jurassic, and some Cretaceous. All of these
strata have a nearly uniform dip to the
right and are overlain both in the foreground
and in the distance by Tertiary Lake deposits.
I have sketched the view and have photos as
seen from a high Tertiary hill between camp and
the Canon.

In the evening we had a good dinner.
Mr. Lawson tells me the granite has not
yet begun to flake and shows no decomposition.
It had been around clear of all its decomposition
now. Over this lies the Carboniferous, by
a series of terraces and plateaus from town

thick, about 20 feet. The surface is covered with quartzites and beds of sandstones.

At the base of the so-called Andersonian Mrs. Anderson found a large piece of *Trinotula* and a species which is very similar that this is not a *Trinotula* but merely a continuation of the *Trinotula* limestone. Since these strata appear to conform to within the Cambrian the question is not age but then what? The only fossils seen are small *Trinotula*.

Aug 6-99 Sunday Camp ~~IX~~.

After breakfast the Coopers took us to the Little ~~camp~~ of the North Platte about 6 miles by road from the camp. Here a hill 400 feet high is thrown up with the strike eastward. The river has cut a narrow gorge 400 ft deep and about 200 feet ^{across} to the North. It is only about 400 feet of white to yellowish sand. It is all apparently older than the Camb.

July 16-99
 Evidence of N. Platte into Little Niangua
 than evidence down a N. & S. line on side to south.

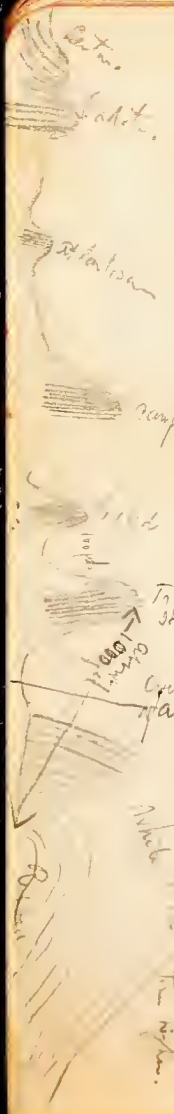
These shales containing in one bed only the portion west of the Platte river
 The shales in fact are about E. & W.

Scout's Creek

Tr. arm. l. p. to
 Stone & fossils.

Apert thrust
 fault. At this point
 no clay. thin.
 A simple and gold.

July 16-99
 The shales
 are at the
 top of the
 hill.



The general structure of the region is shown in the two previous sketches. Near the middle of the Canon there is a hot spring in which a very green algae is growing.

Aug. - 99 windy Camp. IX,



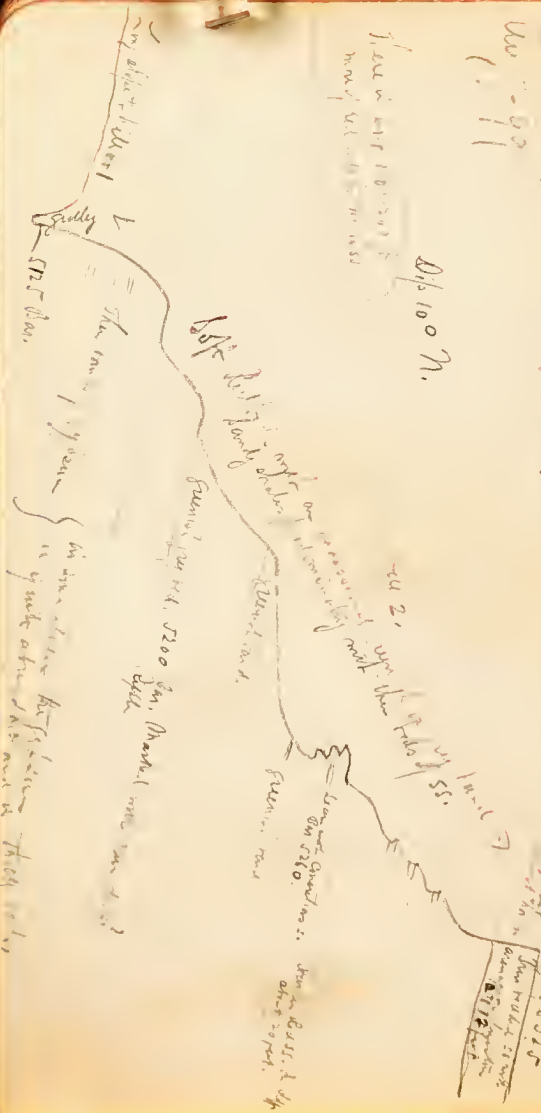
Entrance of Little Canon,
To show a slight displacement. See
note. Red bed.

Section from IX to North (in line)
 above & below Orchard & South line.
 good over

Nov 11-99

Dip 100 N.

There is a lot of sand & gravel
 near the top of the section



Ther. 1000 ft.
 about 2000 ft. high
 Dip 100 N.

Sept 3.

Aug 7-99

Added to Carl's notes
a corner of the same

Dip about 15-20 N. E.

Trace of them very visible
at least 500 yds. from it -
but few here.

Distance about 275 yds.
to corner in line of the road
to the west of the road.
13 Aug. 1899.
C. M. S. 110

Strong local white
about 15 yds.
The sand, water, with
very soft porous material
about 15 yds.
C. M. S. 110

The fossils are
the fossils 12 yds.
from the road.
C. M. S. 110

See the fossils
C. M. S. 110

...

that

To the aid of this will the
Boswell family and the
of our people

Reston here is banished and his 'three
too fast for all'. The known adaptation
by 'paul'.

三

576-
1880
The
The
The

Doc 4975.

that, her insubstantiality, he is not
than in the 11-
Pret. & 12-13

57301
440

Red

Gray
Red. Little with black
Red. Little with black
Black.

10-1-19

12-1-19
12-1-19

12-1-19
12-1-19

12-1-19
12-1-19

12-1-19
12-1-19

12-1-19
12-1-19

Aug 7-99.

Along the eastern end of the hill ~~through which~~
~~the road runs from~~ the Little Canon one can see
the red beds and ^{the} ~~from~~ coming over the
lower crest. Passing over to the S the same beds
are seen to dip ^{suddenly from a high horizon} ~~from~~ ^{to the S.} and in the
distance the horizon is seen dipping about N.-0 N.
The overthrust fault is most marked at the
Little Canon.

In this region beneath the Frey, but Little Canon
there must be at least 400 feet of Red Bed. Towards
the bottom a much of thick greenish sandy
rock appears and near the center where the
great thickness of the beds occurs.

The section can be said to show the transition
of the Red Bed to a blue sandstone since both in the
lower and upper series. The horizon is quite along this line.

The section is not long. It is in the Little
Canon at the red sandstone and is rather near
the Frey that L. horizon. It is a little over
one mile from the dip - where S to there dipping
about N.-0 N. Frey through the arch.

Twenty three miles from here today.

Jan 19 and 18. Section of Barn of the Atlantic.

is a well-known fact that the

the top of the hill is

Jan 1860

Jan 1860

Jan 1860

Jan 1860

Jan 1860

Jan 1860

Jan 1860

Jan 1860

Jan 1860

Jan 1860

Jan 1860

Jan 1860

Jan 1860

Jan 1860

0110

Frank

a one found. I did not. At the other top, you find
 (more) but some. ^{also} I saw a specimen, 2

There is an unevenness between the Cañon
and which I measured at the head of the Cañon
there is not more than 260 feet Cañon-
width while when we saw the Cañon Ave. - in
the lower part about 400 ft. The house
includes a ^{logically} ~~large~~ ^{small} ~~area~~ since there at the base
is an ~~undisturbed~~ ^{open} ~~field~~ ^{Fernesteta} (large ponds and an
abundance) and ~~other~~.

At the village of the Humber (this seems to me like it) at the base of the ^{granite} dome and for one detects there no vegetation. At the little town the top of the hill at the base of the dome is covered otherwise the beds are alike. At the S.E. end of the dome there is a distance one can see the Tertiary land down

apparently conformable on Cambrian and on the next lies
to the east on Carb. Near S.E. it rests on the
granite. To the N.W. it lies in turn on the
Trias, gray and Benton.

The White Trias is irregular in deposition on
the red Carb. and is often strongly cross bedded.

The pebbles of the so-called Cambrian are
very massive usually in lengths of about four inches
and one inch thick and high. They lay very thick
in the Creek.

Recent estimates of the thickness of the beds
above the Cambrian are 227 feet. The fossil *Camara-*
shoria 47 feet above the sandstone. This species reminds
much of a Permian species. Another one had an
even ribbed one. This red bed is only 6 feet thick which
implies at least 10 feet. This adds to the belief that
these beds introduce the Trias.

Aug. - 29 Wednesday. Camp. IX.

Spent the morning and afternoon collecting
mainly in the hills toward
and nearest to Little Canon. Found two
good nodules loaded with *serpents*.

The Ammonites occur near the top of the
main *serpents* with the great majority of
fossils. Those found at this place have been before
here drifted from this upper zone.

him of his wife a trapper who he engaged
in September. He tells him ^{not to} to secure his
outfit Two weeks later the murder was
discovered and later it was said he was
drowned in the Saskatchewan at Dorsey. The
Mr. Baker was to secure a guide on the Great
Horned but in the mean time engaged this
murderer. In 1865. The place is in the Indian
Country at the river crossing at a little stream

We arrived at our former camp on
 Tuesday night and camped on the ^{North} side of
 Ranch.

Aug. 15, 99 - 1 day, Camp X

It was a cold night. The cook found ice in
his water bucket this morning. He & all start
for the Tashan hills I see across.

Some good weather in the afternoon. Bats
were seen flying over the camp. The house
The next day being Sunday, I left the station

of the night discuss the road to continue
but the custom concluded me to. So during
the night Poling & Letherston grazed the bits
of the horses on the beam, & so. When the
dawn had been seen and when the sun
rose for the day the moment they smelt
the beam rose again. They roared and
when seemed to be in a rage that day.

Among mountains of the Tertiary hills we
are on the rim. Below the where a man
dug out a hole in the ground. To our right is
an isolated peak reminding some of the hero.
also much. In the center of the hill.
In front of us, up the hill is a series
of round domes surrounding a temple like structure.
In a place a road leads to a series of eroded out
of variegated clays and surrounded by a thick bed
of sandy clay in some sections. In some
sections of the hill it is marked by the
temple.
The road is at the top of the hill. The road is
long and low. and we see a wonderful scene
of erosion. It looks like a thousand years

(feet)
 175
 125
 350 ft
 200 ft
 250 ft
 800

(meters)
 100
 250
 340

The 13 Sunday Camp XI.

Are Tertiary
 on the base section of the towers.

Above it is a layer can be seen 240 ft of sandy
 clays in the north in next page

7325

grassy
 slope 70 feet

7250 by tower

Yellowish white soft
 clays in towers.

Upper half with numerous
 turtle bones and an early
 mammal bone 100 ft

Titanotherium

Phosphorodontid 14th

Red granite conglomerate 100 ft

Helix near top
 Yellowish white soft clays weathering
 into towers.

Dunes near

125 feet

7025

many old bones, recent pebbles by water, shells
 and some antlers. Fossil wood near center 6975 Bas.

most part of the base is a sandstone.

175 feet

almost all clay, with small bones.

6800 Bas.

50 feet

gravel level of rock 6600 Bas.

The Red granite must also be seen in the present and has
 topped the clays and redeposited it in the lower clay
 and the granite conglomerate in even bedding.

For detail as to the Cannon & Sales Hole
County go to Boney Ernest Ferris, Ky. He
is in this county since 1860 and is now about
60 years old. Anythg you ask him reliable.

In the gulches along the inner side of the river
grow beautifully cone shaped Red Spruce (Picea
douglasii) 60 ft tall in 2 ft thick. A pine
is also abundant, Pinus murryana. The common
"sage brush" is Artemisia tridentata. The cotton-
woods we saw in the Grand ^{Cannon} ^{at C. Mt} ~~Cannon~~ County are
Populus coccinea, & P. angustifolia. Both are
used in a manner as shade trees. The common
Juniper we saw or met in the Cannon county is
Juniperus communis alpina & J. virginica.
The red berried little bush amongst the sage brush
in the gulches here is Chus trilobata. The quaking
asp we saw at Lullavans is Populus tremuloides
and the willow Salix rostrata. Along the small
streams alder is common (Alnus incana
virescens) and the mountain birch (Betula
glandulosa). Grease wood
leaf cutters.

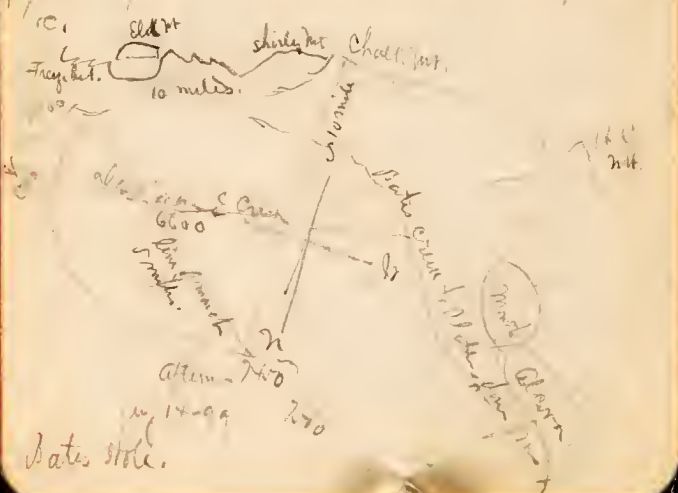
In the hole 20528,000 years.

$$\begin{array}{r} 7160 \\ 330 \\ \hline 2 \end{array}$$

Aug. 14 Sunday. Camp XI

Top of hill S.E. of about 2000 Bar. Titan. bed, 7300
base of slope near top of hill. Lowest level
reached 6600.

At afternoon place ~~7000 Bar with 200 feet~~
Limestone of 7160 about 10 feet thick. Foliated by a
crinoid with Pecten about one foot thick and then more
encl. 3 feet sandstone layer a lower top of 7450
At the northern side there seems to be from 200 to 250
feet more of strata than shown on map east of the



The "Two Mile" outlet say a fine level
arrived at the mouth and learned that the entire hole had
a depth of 1700 feet.

It is a most beautiful view. The country is
very fertile. Cattle are abundant at least 10 miles. The
crops seen today is wonderful. I think there are
cattle for miles after another town above on
a height from 4000 to 5000 feet. Then between the
cattle are the bluish to white talus slopes studded with
spruce or pines many of which have their roots exposed
appearing as if standing on stilts. Collected the *Stemmatium*
mineral near. Also some *Physcia* photos.

Aug. 5. Tuesday. Camp XI & XII.

Left camp at 9.30 and camped this evening on
Table Rock. The River was 42 miles across. It is
now nearly at the end of the Tertiary. The Tertiary
(? Permian) is seen in the Laramie range.

For the first time saw some of the old
cattle. After about 10 miles. At this night camp around
the river which is a little more water the sheep are
corralled. Some little distance from the camp on a stick with
a rope at the end which scares away all coyotes from
stealing lambs. The flutings say is too dangerous

a thing for a coyote. The herder some boy is driving this.
Coming over the Tertiary plains today across a plain
new secured by one. A few were very fine. The moon
in many places.

Aug 16 Wednes. day. Jan. XII & XIII.

It rained a little before the start and
all wet outside: camp. After lying out we
start at 9.30 A.M. on Box Elder ^{Creek} on the north side of
Laramie Mts. We arrive at our camp at 1.30 P.M. beside
a small brook ^{a branch of the Box Elder Creek} surrounded by granitic hills and an abundance
of woods. Distance covered about 10 miles.

The Tertiary this morning was seen in the distance the
granitic hills. Our way on the Tertiary a short distance over
the range and before from across. It was on the north
side. Granite all about us.

The country this morning is almost unbroken
and just then is an abundance of grass for cattle. As we approach
our camp we see remnants of an extensive ranch ^{place} formerly owned
by the Douglas, Millers, & others company. In this region was
the Evans ranch. Both of these outfits once owned
a few thousand head of horses and an many cattle.

Dec
In the ~~San Juan~~ county in the States Mr.
Hanson a ste of Laramie came across a herd of
a number of ~~old~~ ^{old}. He found on the ca-
small and if he had had the assistance of the
latter the entire herd could have been corralled. As it
was one of a small herd could not run as fast as the
others showed forth which made the horse was driving
a little in with that the herd while all around
the corral.

It rained a little in the afternoon.

Aug 17 Thursday. Camp XIII.

Looked around among the granitic rocks but
found nothing of value besides a few specimens of
obsidian from a quarry. Then collected a few
~~rocks~~ by the lake of the day. Found an orchid.

The hills also here are in places almost in-
soluble for fallen timber. A forest fire has been some
time ago and the young timber is starting again
particularly quaking aspen and cottonwood.

Rained again in the evening.

Aug 18 Friday, Camp. XIII & XIV.

Started on the Little ^{more from Burnett} Magalloway River where we arrived about 10 M. on the old Ogun Ranch.

Collected plants in the afternoon.

The hills near our camp have a very coarse conglomerate of granite debris from the granite hills a very short distance away. In this congl. are very much broken bones of Titanotherium. The old Miocene shore line with the beach shown with granite fragments, derived from the cliffs against which reached the sea.

Aug 19 Saturday, Camp. XV.

This morning we started out for "Specimen Hill" about 2 miles N.E. of camp. In some places these hills are covered with coarse gravels which the Red Man used to secure his flints. There are numerous shallops and an occasional rough hole. Here on these hills are found numerous beautiful calcedonic or quartz pebbles or rather agates along with much magnesian and moss agates. Indeed Jasper also. All of my unlabeled specimens are from this hill.

On these hills I found Semina subtilis Euomphalus, Megalina and

Kn. to saw Dubya and Mr. Tubner collect
Spizella communis. The age of these hills is
therefore after Carboniferous.

These hills lie at the base of the Laramie
granite hills and both may be covered by the
glaciation. I have no doubts that the moss opals
which are found in the Tertiary near here are further
west derived from the Carboniferous.

In the afternoon I went to the "Red Hills" S.W.
about 3 miles from camp. Here we also found
calcedonic stelaclites but more finger shaped.
He saw no fossils but I have no doubts that
these stelaclite hills lie above the Upper Carboni-
ferous and may be either Permian or Triassic.
This inference is based on the dip of the Carb seen
in the morning.

Collected about 40 pounds of minerals today.

Aug 20 Sunday. Camp. XIV.

Packed the material collected yesterday into four sacks.

Wrote letters to Mrs. & Mrs. Stanton, Merrill Hills and Whitch.

Duncan brought in a sage trunk about 3 in. in diameter and 18 in. long. This is by no means the largest example. Another ordinary sized buck had 38 rings, having a diameter of 1 3/4 in.

From our camp in the back sand of John Burnett's Ranch one can see in the southwest the Shirley Mts and distinctly the Saw Tooth Mt near Lullwater Ranch.

Aug 21 Monday. Camp XIV & XV

Everyone is busy packing the mammals collected.

About 11:30 p.m. we left John Burnett's place to head down the river in little boat canoe.

We were at 6 A.M. Have dinner at Shup's place by 1:30. Start again at 2:45 and camp in the night country, Toller near Mr. Gillespie's Ranch.

All the way on the west and south of the Laramie granite hills either over the Tertiary or the Cretaceous, and then the Triassic. At Sheep Creek the Triassic red beds are present in low wash cuts for some miles around. The beds are sheathed in all directions by gypsum or secondary deposits. An ore near again the granite hills the Cretaceous appears.

Aug 22-23 Tuesday Camp XV & XVI.

As we retired last night the atmosphere was warm but before the wind began to howl and this morning it is cool and windy. We leave camp 8 and reach Deer Creek ^(about 2 and 4 miles) near Eagle Creek at about 12.30. Our camp is partially situated in a narrow valley surrounded by granite and in abundance of grass. A ranch house was once situated here but now nearly ruined and abandoned.

In the afternoon I went to the higher dryer
meeting plants first over the higher dryer

ground and then along the small streams. Worked
late breezy day.

All the rocks of the region is a granite like
that of the Indian Lake Mts. A red granite
is also visible. The granite is cut by numerous
dikes of dark rock. Of the latter I have samples.

Aug 23 - 99 Wednesday Camp. XVI.

The night was a cold one, and this morning
~~our water was~~ has ice 3 inches thick.

At 8 A.M. we all started out to climb Laramie
Peak. The elevation of our camp coming and going is
6975 feet Bar. At the barren dam at the base of
Laramie Peak in the largest stream the elevation is
7300. We selected a place on the west side of the peak
where a dike has been worked out with granite walls
in boulder heaps. Some worked in such a place. I
found it very hard climbing and ascended to 8675.
Cameron who was with me ascended to 9020. ^{Actual height is 9020} On
our return to camp I learned that neither one of
us had been near the top. Prof. Rose and
Trasky did go to the top which was about one

which we found on a log through the valley. This
on the ~~ground~~ ^{ground} in the ~~valley~~ ^{valley}. Then we ~~found~~ ^{found}

from mile to mile to camp.

Every one reached camp safely but my
trunk.

I did not intend to climb the entire trail
and by an accident I had Ross' lunch which
consisted of biscuits and fruit. Prunes & figs. The
latter were not eaten by the natives. The meat was very
fatty but otherwise the meat is wholesome.

Aug 24-99 Tuesday. Camp XVI.

The night was very cold and our pans this
morning have ice for meat &c.

Immediately after breakfast I go down the
creek stream from our Camp about half mile to
study the roots of the beavers. These beavers
seem to be damming the stream more and more
down stream to find just where they make trees that
seem to be the chief work. They cut down the
trees from an inch to those 10 & 12 inches in diameter.
They are gnawed about 18 ^{inches} from the ground on all
sides of the trunk and the trees fall in any

direction. They then grow off the side of the
tree showing the snake branches are all suble
on the ground to the ground, you they are left
on pattern use and good. These animals appear
left winter and and the inner living layer which
they feed on, it is even so, they are inner
wood. The trees are usually less than 50 ft
long. They have numerous cracks leading to the
trunk and some out from the back water over-
looking the river. These they try to avoid
trapped for a long time, and several are
in the river, but they are not in the
in the strong and strong ground where they are fallen.
In some cases trees are, several considered and
are the best. Another tree is at the
mouth of such a wound. American in 2 ft.

We broke camp and left on 8:30. Shortly I
met Mr. Frank Payer (Carroll P.C. by way of
Proctor). The American born in Norway came
- Denver in 1858 and settled at the
mouth of the river with the French troops.

He came out from the Merrimack county in Maine.
He came to Laramie Park about 1875 and
had numerous encounters with the Sioux Indians
a number of whom he killed. He also met some
kind of medicine man this Indian. The latter
was him to hunt and had on a skin shirt.
He mistook him for a warrior. The Indians
were much amused laughing over. This is very
applicable since he appears to be always laughing.
If I ever visit a place in Laramie Park
it will be nice to pick up this man in the
country.

We camp on the North Fork of the Laramie
River near Prager Crossing about 12 miles from
Laramie Park. We arrived here about 12 noon.

In the afternoon we go about 10 miles
east into the hills and collect what we can find
on and have a few trap lines. In these
hills we collect asbestos and fossils.

We collect a few fossils.

Near this camp is a little log school house
the second one we have met on the trip. It is

presided over by Messrs J. J. Hollway and
intending to go to Cornville and Cameron
by way of the river. After leaving in our
sleigh we have 8 pupils. Her P.O. address is
Antelope Spring, P.O. Barrett by way of Rock
Creek

Aug 29-99 Friday. Camp XVI & XVII.
Left the North Fork of the Laramie at 9 a.m.
and had lunch beside a small spring creek at
12 on the edge of the Teton. After leaving camp
we passed a road that led up to the mountain and
then came to the river again. After leaving the
Creek and the road it is a plain over all of which
lies the Teton.

Two miles from the Laramie from the
camp (XVII) in the morning we saw (Mr. Sell
and I were by in the basket of the Livingston and
railroad). In the vicinity we also saw a very
expensive "Round up". The cattle were

will stay. On the contrary they are a very
excellent breed of cattle and

Kept together in two large bunches into which
the cow boys ride and pick out the desired
cattle and drive it to a bunch forming
between the other two bunches.

Large small & 10" on account for pictures.

Our camp is at Mr. Wells crossing of the Laramie
River in winter and very little to distinguish the
region of the Laramie plains. There are 20 miles on
the camp and a small bridge for the R.R.

Aug 26-99 Saturday Camp XVII & XVIII.

Woke camp and left at 8 A.M. The first day
to come to cross the Laramie River had one the
most without trouble except the one of you is.
One of our horses balked and with that the wheels
came in the sand and then the horse lay flat down
on the sand. Our last resort was to use a horse
and to be pulled over. By a little of
the horse and the water did the job going into the
river.

About noon Mr. Ron ship a badger and
we had today seen one of our hole.

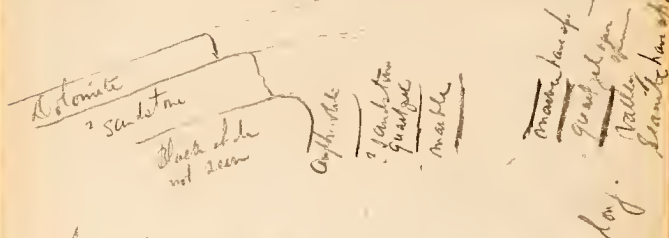
Our camp is pitched on the ridge. Common near the ranch of the geologist. On the hill E. of our farm are some granite hills where collected graphite, iron and granite. The graphite with the iron is interbedded with the granite. This granite is also cut by pegmatite.

Collected north of the lodge house about half mile. Here we secured a granular white marble. It stands on edge against a granite ^{to the east} with other fine grained marble followed by red marble of granite. The marble has streaks of iron. To the west the marble occurs in an amphibolite schist. Sphalerite also occurs here. The age of the marble is not unknown but the occurrence of the rock is important with the mass land. But don't believe it is the same as the granite. The granite is a dark, crystalline. This may also explain the occurrence of graphite in granite. Collected a number of flowers here.

Aug 27-99 Sunday. Camp XVIII.

We made our last camp and got away by 8 A.M. road layed on the Laramie Plains and arrived at Laramie by 3 P.M.

In coming down the Laramie Hills it seems plain to me that Dr. Knight's theory that the marble collected yesterday is the metamorphosed Carboniferous dolomite. The structure seems to be about as follows:



I have specimens of the marble with serpentine and also of the dolomite which I suppose furnished the marble.

Spent a part of the afternoon at Dr. Knight's house and then to the hotel for a clean cloth and a wash. Spent the night at Knight's house.

1701

1 Looking North West showing the top of the Dakota
above the Devonian sandstone. Below with the
massive ledge in the foreground
Probably 2 plates or there.

2 On the Frequent crater rim, looking N.E.
at the Devonian is a massive ledge.

3 On the F.O. Crater rim looking at the
front portion of the Frequent crater rim.
4 In the crater looking back to the
red bluff and across to Frequent
Cut Mt.

5 Eastern Bluff F.O.M. showing the same

6 S.E. side of Frequent Cut Mt. showing the ledge.

Patley Johnston

Ed. Harper.

April 1900. Can be seen from a high place.

